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ABSTRACT

This study is an ongoing examination of the effectiveness of an online professional development course designed to examine the connection between learning theory and technology used to support learning in the classroom. The course was taught by three methodologies: a traditional face-to-face class that used the online materials as a resource; an online class that received all instruction via the Internet; and a hybrid class that used the online resources in addition to meeting weekly for teleconferencing with the instructor. At the completion of the course, data was collected from the participants relating to course design and implementation resulting in positive feedback from most students. To ascertain changes in attitude and classroom practice, further data was requested from the students six months after completion of the course. This study focuses on the second round of data collection and examines the changes in attitude and practice reported by the teachers. (Author)

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Information and Communication Technologies in the Teaching and Learning Process: Does Online Professional Development Make a Difference?

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Abstract

This study is an ongoing examination of the effectiveness of an online professional development course designed to examine the connection between learning theory and technology used to support learning in the classroom. The course was taught by three methodologies: a traditional face-to-face class that used the online materials as a resource; an online class that received all instruction via the Internet; and a hybrid class that used the online resources in addition to meeting weekly for teleconferencing with the instructor. At the completion of the course, data was collected from the participants relating to course design and implementation resulting in positive feedback from most students. To ascertain changes in attitude and classroom practice, further data was requested from the students six months after completion of the course. This study focuses on the second round of data collection and examines the changes in attitude and practice reported by the teachers.

Introduction

Information Technology in the Teaching and Learning Process is a core course in a seven course Diploma of Information and Communication Technology at the Christchurch College of Education in Christchurch, New Zealand. The diploma attracts practicing teachers who want to upgrade qualifications and gain skills in using information and communication technologies (ICT). The course is designed to examine the connection between learning theory and technology used to enhance learning in the classroom, and was formerly taught as a face-to-face course with provision for the occasional distance student made available through teleconferencing. At the beginning of 2001, an increased demand from students around the country wishing to enrol in the course as distance learners led to the decision to develop the course for online delivery. Due to the configuration of students requesting enrolment in the course, three different methodologies were identified: a traditional face-to-face group that would meet bi-weekly with the instructor on campus and use the online materials as a resource; an online group that would receive all instruction via the Internet; and a hybrid group involving a group of teachers in a remote location who would use the online resources in addition to an initial two-day, face-to-face start to the class with the instructor. A weekly phone conference between the instructor and the assembled group was also a dimension of this hybrid class. The existence of the three methodologies presented a unique opportunity to explore how the use of telecommunications impacted each of the groups as they interacted with the course materials, the instructor, other class members and with the technological interface used to deliver the course. Also of interest was the impact that this class had on the teachers' attitude and practice in their individual classrooms.

Literature Review

Online professional development is a new methodology that is increasing rapidly. New demands are being placed on teachers and school as an outgrowth of the demands of the knowledge age society, new understandings of the teaching and learning process, and an upsurge in the design and availability of new technologies. These new demands are forcing changes in professional development (Moon, 2000; Trewern, 1999) and have contributed to the growth of professional development offered through telecommunications (Bates, 1995; Blanton, Moorman, & Trathen, 1998). One such change is the availability of professional development presented to practicing educators online, allowing them to take advantage of new interactive technologies that offer study at a time and place convenient to them (Leonard, 1999; McIsaac & Gunawardena, 1996).

Berge (1998) describes two major frameworks from which to view instruction. The first is a *transmission* framework, examples being lectures, textbooks and videotape and is based on theories of positivism and behaviourism. The second, a *transformation* framework, in which the learner transforms information by generating hypotheses, making decisions and constructing knowledge either individually or through a social interaction with others, is based on the theory of constructivism. Contrasting these methods as

teacher centred versus learner centred, Berge states that instructors have implicit or explicit personal theories about good instruction and will choose teaching methodologies and technologies according to these preferences. Bates (1995) cautions that the transmission model no longer meets the changing needs of the knowledge economy workers, where communicating effectively, working in teams, analysing information and generating new knowledge are creating complex new educational needs.

The design of online instruction needs to shift from prescriptive, directed learning situations to environments that allow learners to solve real-world problems and engage in dialogues with a community of practitioners (Jonassen, Davidson, Collins, Campbell, & Haag, 1995). Describing constructivist environments as those that "engage learners in knowledge construction through collaborative activities that embed learning in a meaningful context and through reflection on what has been learned through conversation with others learners," (p. 13) Jonassen et.al suggests a framework of context, construction, collaboration and conversation to facilitate the making of meaning for learners. Within the online learning environment, this framework can be mediated by a variety of technologies. Computer-mediated communication is available through electronic mail, computer based discussion and conferencing. Collaboration is available online through the ability of the technology to support groups across a distributed environment where learners can actively work toward a negotiated meaning. Using situated, case-based learning to give authentic contexts in which students can work, is supported by both video and hypermedia environments and gives learners an opportunity to reflect, communicate and negotiate a shared meaning within the group (Jonassen et al., 1995). Wiggins (1993) defines the characteristics of good learning environments, both distance and local, as being centred on worthy problems or important questions, including tasks that are replicas of real-world problems faced by professionals in the field, providing access to resources commonly available to those professionals, and presenting problems that require a repertoire of knowledge, judgement and skills. In defining the constructivist online environment Jonassen et.al (1995) states: "Constructivism can provide theoretical bases for unique and exciting distance learning environments. These environments should emerge from authentic tasks, engage the learners in meaningful, problem-based thinking and require negotiation of meaning and reflection on what has been learned" (p. 21).

Design and Implementation of the Course

The outcomes of this course required that students examine a variety of learning theories and teaching strategies, look at current research in the field and apply practical skills. To accomplish these goals the instructor used a combination of directed, transmission oriented learning such as lectures or explanatory content, practical activities and readings; and more transformational, constructivist approaches such as reflection, evaluation and discussion. To give the students a chance to work through these concepts and make personal meaning from the idea presented, students were asked to reflect on what they had read, apply the learning to their own situation and/or evaluate materials within the context of their own teaching situation. Questions were posed through the discussion forum where students could offer opinions, solutions and share experiences based on their personal reflections and interactions with the course materials.

Methodology

This study was begun in February 2001 during the first semester of the academic year in the southern hemisphere. Twenty-nine students enrolled in the course with 14 in the hybrid group, 8 in the online group and 7 in the on-campus group. To evaluate the effectiveness of the course design and understand the students' perceptions and satisfaction with the course, the following data from the hybrid, online and campus groups was available: initial survey of online students, statistics from the courseware used to present the course materials, e-mail between lecturer and students, discussion board archives and end of course survey.

Since the data collected during and immediately after the course reflect only participants perception of the design and implementation of the course, further data was needed to examine any change of attitude or practice in the teachers' classroom practice. Six months after the end of the course, students were asked to reflect and comment on changes in attitude or classroom practice that they could attribute to their participation in the course.

Results

Results of the end of course survey showed that students reacted positively to the structure and design of assignments, with only one campus student marking 'disagree' to the question "Assignments were of definite instructional value," and all others marking either 'strongly agree' (33%) or 'agree' (62%). When asked to comment on the effectiveness of the instructional methods used in the class, 62% of students marked 'strongly agree' and 38% of students marked 'agree.' Students were equally positive about the student-student interaction and student-instructor interactivity, and 100% of the students felt that the course helped them to see the relationship between learning theory and information and communication technologies, with 57% marking 'strongly agree' and 43% marking 'agree.' Students felt that the course would help them integrate ICT into their classroom activities with 62% marking 'strongly agree' and 24% marking "agree." Overall, differences in satisfaction between the participants in the three course methodologies, although they did exist, were minor and not statistically significant due to the small sample. The majority of the students were positive about their participation in the course, their interactions with the instructor and the other students, their success with the technological interface and the knowledge gained about teaching and learning with information and communication technologies.

While these results showed that students responded well to the combination of both directed and constructivist instructional methods, and were pleased with the content of the course, these findings did not indicate whether the course would have significant impact on the attitudes and classroom practice of the teachers involved. To determine the impact of the course content six months later, answers to an e-mail questionnaire were examined. Ten teachers returned the questionnaire, which represented a third of the participants.

The first question asked the teachers to comment on any change in attitude or perception about either technology, learning theory or teaching in general that they attributed to the content or interactions in the course. The answers to this question fell into three categories: confidence, leadership and teaching/learning.

Confidence

All the teachers reported feeling more confident. Four teachers mentioned specifically that they felt more confident about their own use of information and communication technologies. Four teachers reported that they were more assured about their own academic abilities or more confident about taking part in discussions about learning theory and/or research relating to the use of technology in the classroom.

"I also feel that the research we had to do, as part of the course, was good for me personally, as it made me feel more confident in myself. Doing the readings, the bibliography and the presentation were all hard work, but I felt extremely pleased with my efforts and finished products."

"I've certainly gained more direction and confidence to mix it with those whom I perceive to be more technologically literate ..."

"... and being able to wax eloquent with such terminology as constructivism and scaffolding while discussing lesson plans proves that my IT self-confidence has gone up the scale tremendously."

Several teachers noted that they found themselves more confident as they planned instruction.

"This has helped me to have greater confidence in using ICT with my classes and to be less concerned about not knowing how to do everything."

"It has also helped me to become more comfortable in an ICT environment where collaboration and teacher facilitation are often the most effective strategies to use when managing a class."

But more so, the readings have given me the confidence and knowledge to trial things. The stress seems to have alleviated when setting up items for the class, eg. Hyperstudio stacks at the beginning of the year were effortless. I now think the big stresses came from me, as the children pick it up so quickly."

Leadership

Several teachers commented on leadership roles they had assumed. Some of these roles were formal such as becoming the technology coordinator for the school, running professional development sessions for staff or posting technology rich lesson plans on a website; while others were more informal:

"This course has also made me think more closely how to regard computer skills – or lack of them – amongst colleagues and how to extend the common pool of knowledge within the school."

"I read information [in the course] that I have referred to since and passed on to other teachers I work with."

"Attitude was positive to start with, but knowledge gained has led to informal discussion with peers and increasing their options."

Teaching/Learning

Comments were mentioned by the teachers that pointed out changes in perceptions toward teaching and learning.

"I have found myself looking at the work that I am preparing and presenting, and reflecting on whether the knowledge fits the constructivist, directed or behaviourist style and in this reflection I guess comes an improved evaluation of the product as well as a question of the value of the work and how it is presented."

"One of the perceptions that I have become more aware of is sorting out whether the computer is a tutor, tool or tutee. It has made me look closely at what the computer in each situation requires of the learner."

"Whereas I used to be fascinated by what computers and technology could do I am now (since the course) refocused on the fascinating business of learning and how to set up the optimum conditions for it to take place."

"I have found it vital that I know what research says."

The second question focused on the practical classroom applications. Teachers were asked to comment on any activities they had implemented or changes they had made resulting from the knowledge gained in the course. Some answers focused on changes in the classroom that involved the use of technologies.

"I have focussed on information literacy in our library and tried to refine the library use to include the Internet."

"I taught and used PowerPoint and Internet skills in my IT701 assignment. I have since gone on to teach spreadsheets, databases and HTML in basic ways."

Teachers also reported making changes in the way they approached the teaching task, taking the learners' needs into consideration. The following quotes are examples of this.

"My focus with ICT now is to get the children asking focus questions that they will be able to answer."

This course has made me think about direct instruction and how I can present it when teaching computer skills to ensure that the students' learning styles are used and higher order thinking skills are stimulated."

"Probably when I analyse the impact of IT701 on my teaching practice, I believe it has given me ideas on how I can make better use of the computer as a tool and how it fits with learning theories."

Conclusions

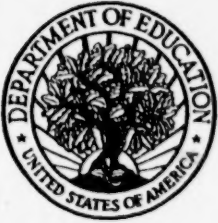
From the ten questionnaires returned there is evidence that the course has had an impact on teachers and they way they approach teaching and learning. Many teachers report increases in confidence in computer use, planning for classroom instruction and academic abilities. Some mention increased leadership within their educational communities. All teachers noted changes in their perceptions and attitudes about using information and communication technologies in the teaching and learning process. These included a new appreciation of constructivist versus directed approaches to teaching and learning, fostering higher order thinking, catering to individual learning styles, the teacher in the role of facilitator, an increased appreciation of the benefits of research findings on classroom practice and reflection and evaluation of their own teaching methods. One teacher described the changes in this way:

"I don't know sometimes I think that I must have been walking around teaching with my eyes closed. Not realising why I am teaching this way, where did these teaching strategies come from and what was I trying to achieve in the class. This course has opened my eyes – even though it is just now that I have realised how much I have changed over the year – it's quite exciting!"

Results from the questionnaire about changes in classroom practice are less clear. Some teachers reported on specific practices they had changed while others reported on changes in focus. In general, the responses from the second question were extensions and variations of the responses to the first question and did not list explicit changes. A limitation of this study is the low number of questionnaires that were returned and the limited scope of the questions asked. Further study would be required to determine the long-term impact of the course content and methodology on the participants' classroom practice.

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